The Potential and Realities of Research in Air Traffic Management

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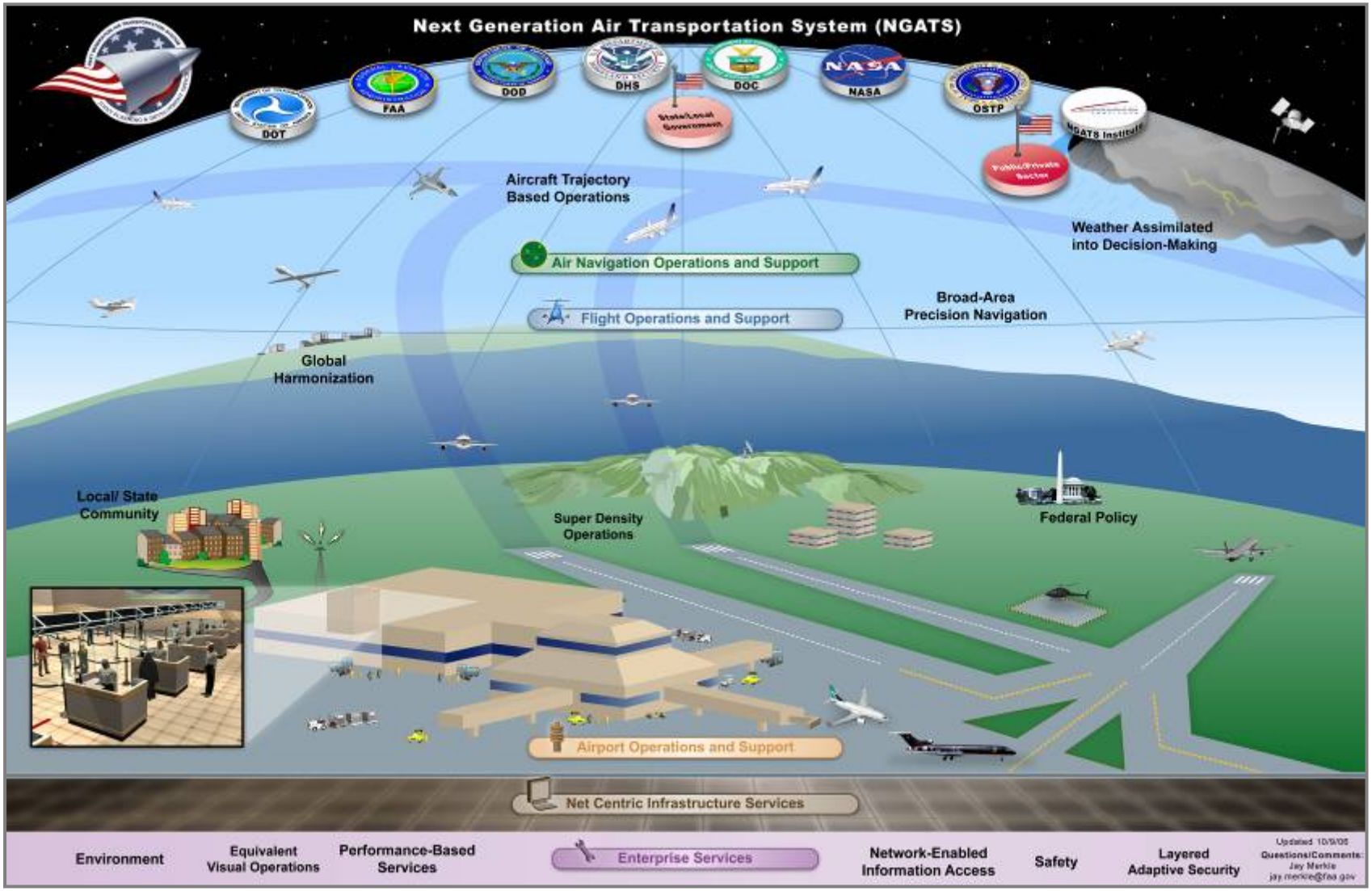
Outline

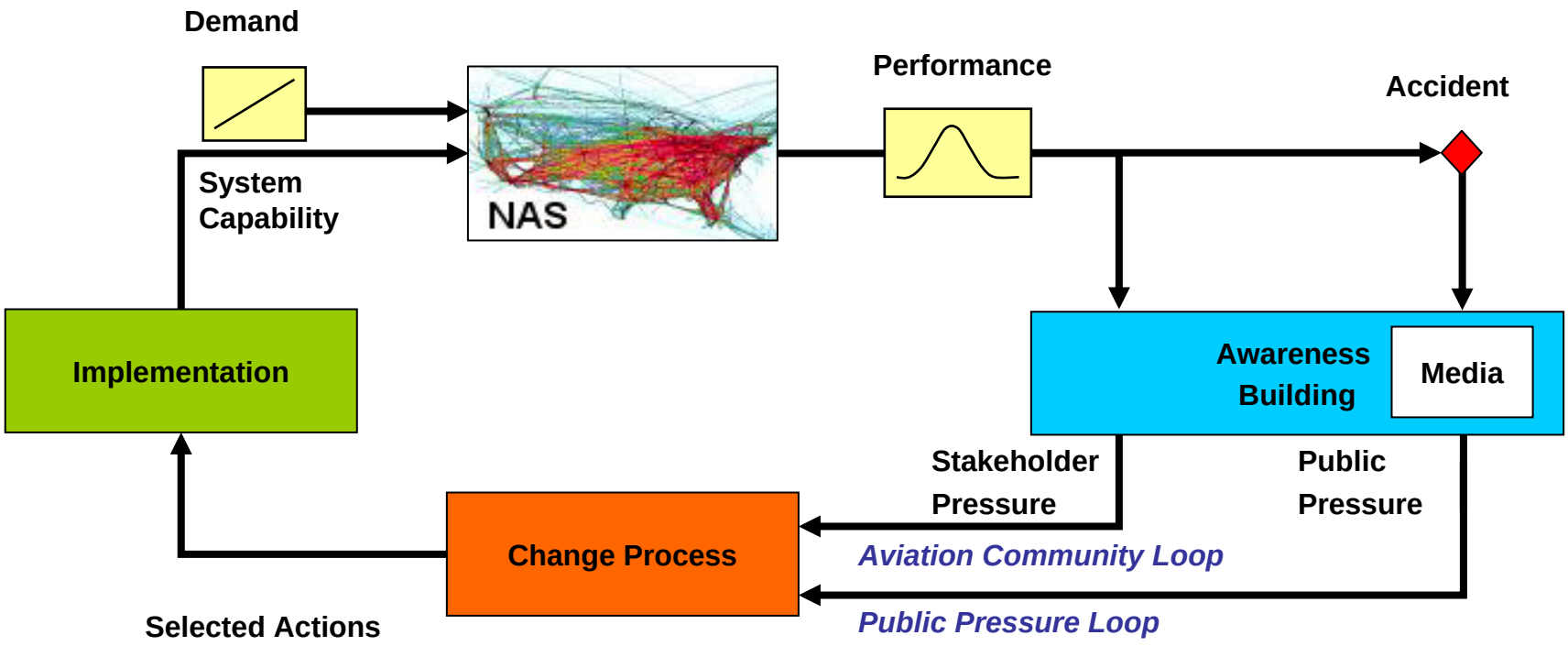
- **Joint Planning and Development Office: Vision and Operational Concept**
- **Research and Development Implications for the National Airspace System**
- **“ilities”**
- **Center/TRACON Automation System**
- **Traffic Management Advisor: Research to Reality Timeline**
- **Concluding Remarks**

NGATS Community Model View



Courtesy of the Joint Planning and Development Office

Historically System Transition was Driven by Safety



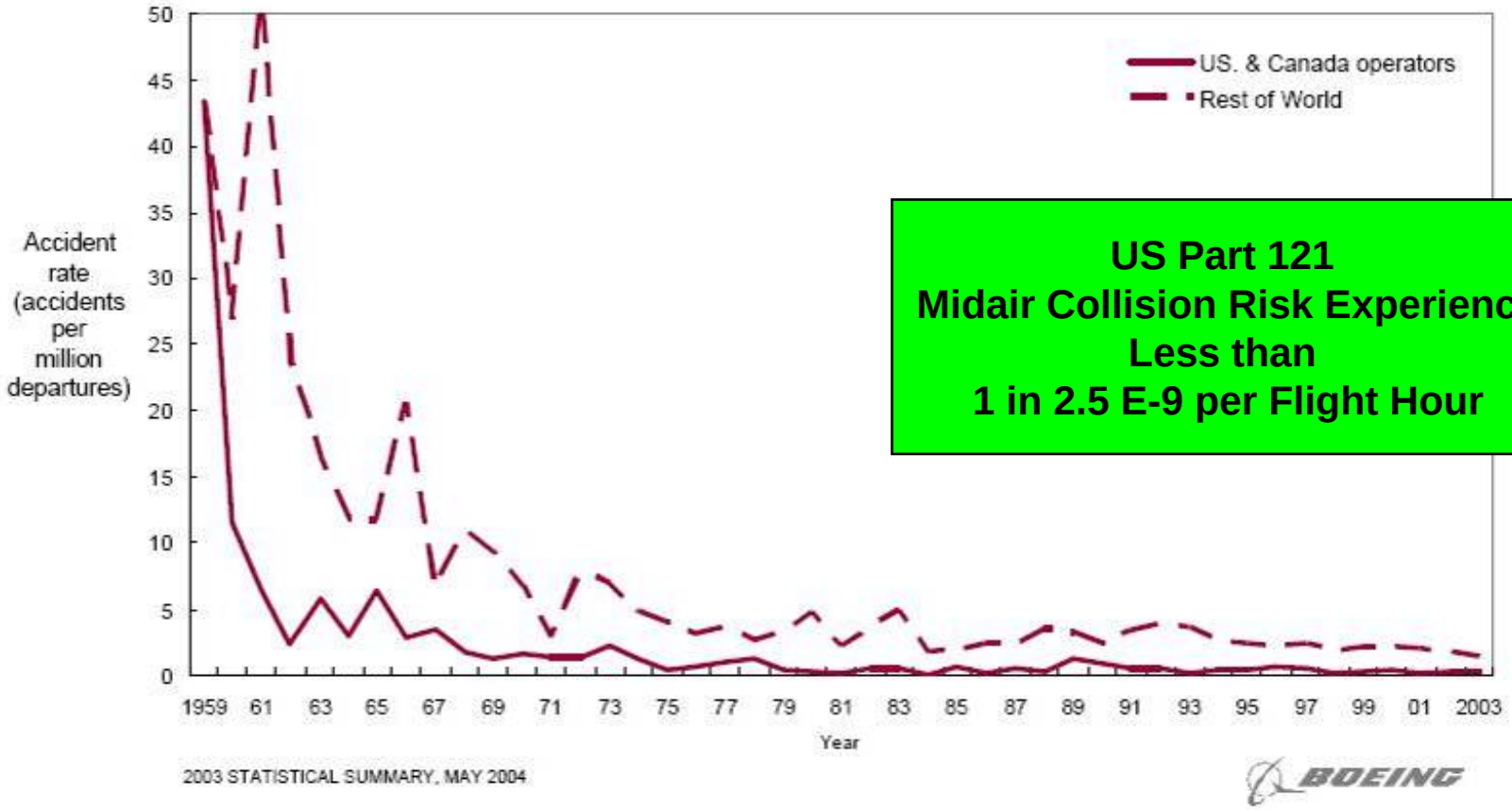
Event	Response
Grand Canyon accident (1955)	Positive Radar Control
Los Cerritos (1986)	TCAS

Courtesy of Professor R. John Hansman, Massachusetts Institute of Technology

Safety is an Less Explicit Driver

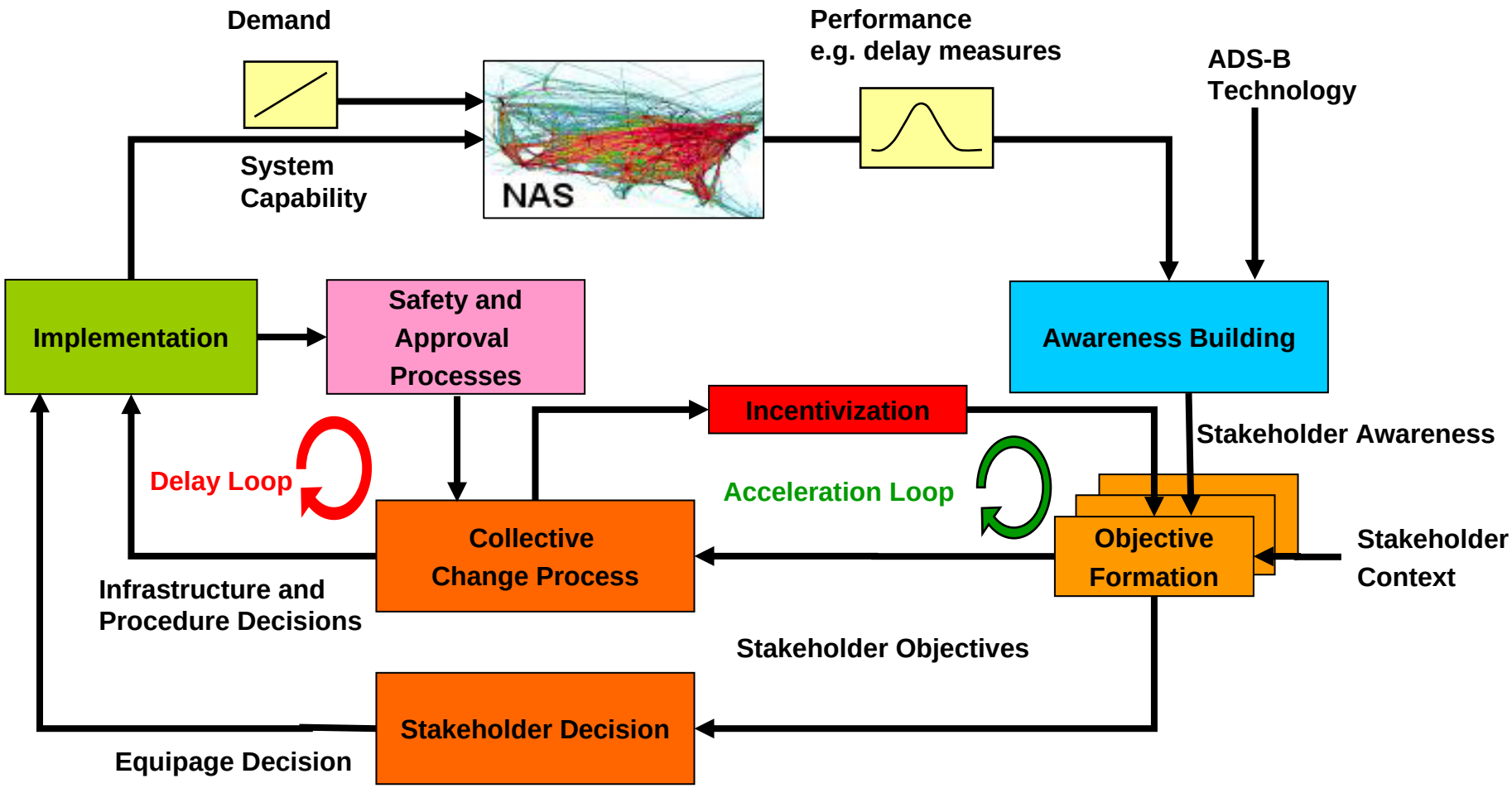
U.S.A. and Canadian Operators Accident Rates

Hull Loss and/or Fatal accidents - Worldwide Commercial Jet Fleet - 1959 through 2003



US Part 121
Midair Collision Risk Experience
Less than
1 in 2.5 E-9 per Flight Hour

Model of System Transition
Acceleration and Delay Loops



Courtesy of Professor R. John Hansman, Massachusetts Institute of Technology

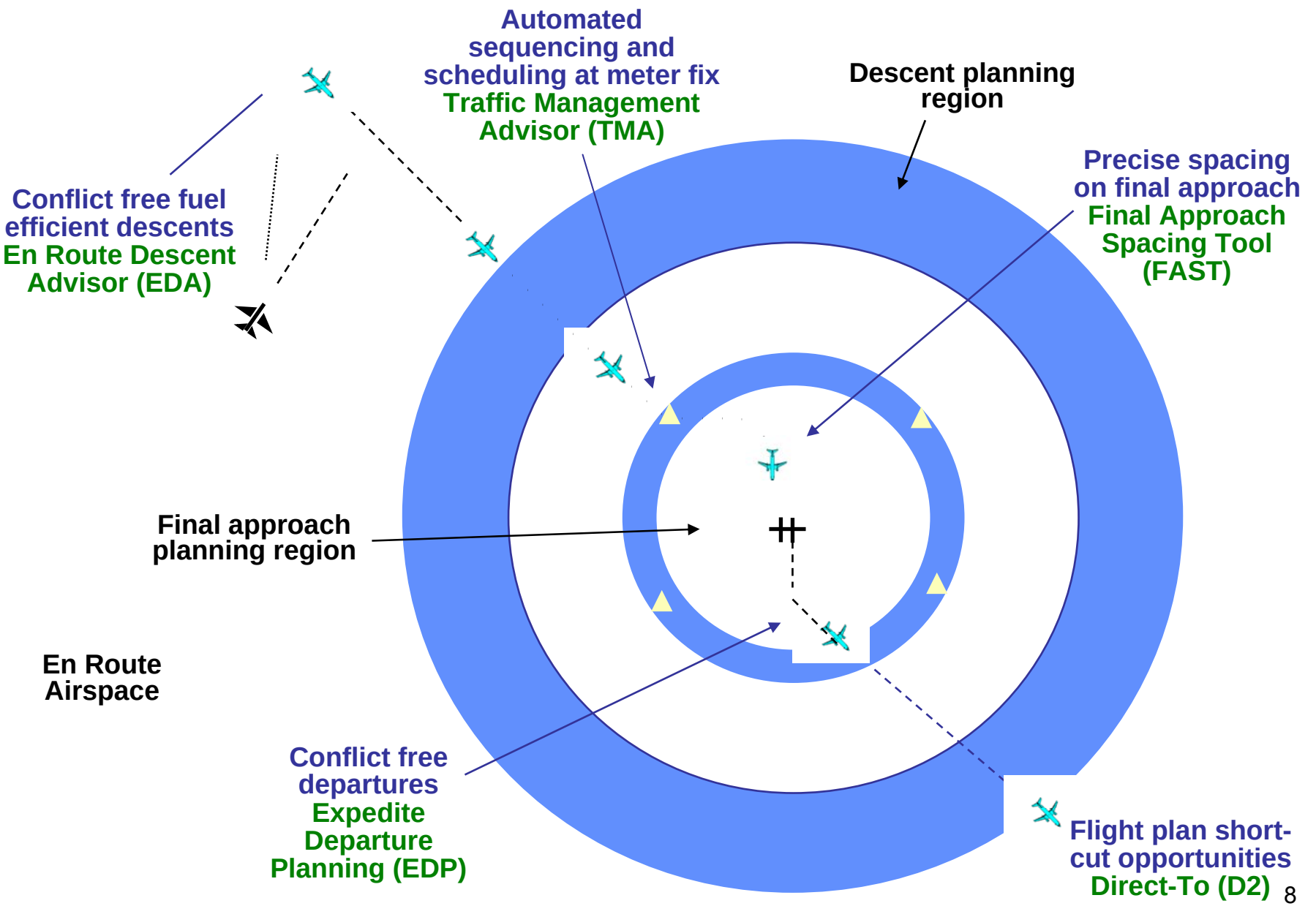
"ilities"

Functionality → Research

Reliability, Availability, Seviceability, Usability, and Installability } **Systems Engineering**

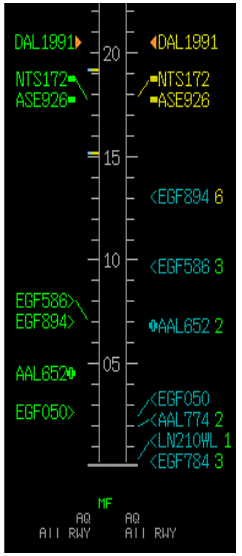
accessibility	distributability	repeatability
accountability	durability	reproducibility
adaptability	evolvability	reusability
administrability	extensibility	scalability
affordability	flexibility	seamlessness
agility	interoperability	securability
auditability	maintainability	simplicity
credibility	manageability	stability
compliant with standards	mobility	survivability
composability	modularity	sustainability
configurability	nomadicity	tailorability
customizability	operability	testability
degradability	portability	timeliness
demonstrability	predictability	understandability
dependability	recoverability	
deployability	relevance	

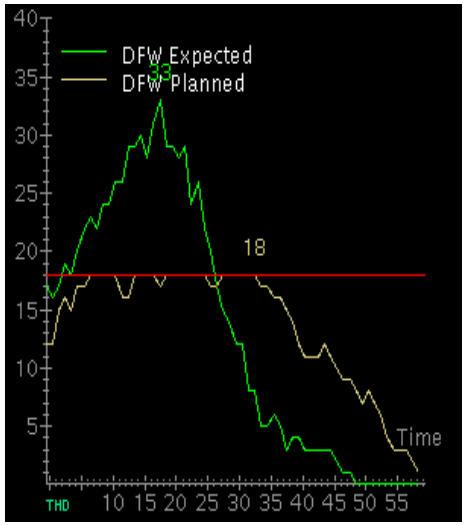
Center/TRACON Automation System



Traffic Management Advisor (TMA)

- A set of scheduling and flow management tools that assist air traffic mangers and sector controllers in balancing arrival demand with airport capacity

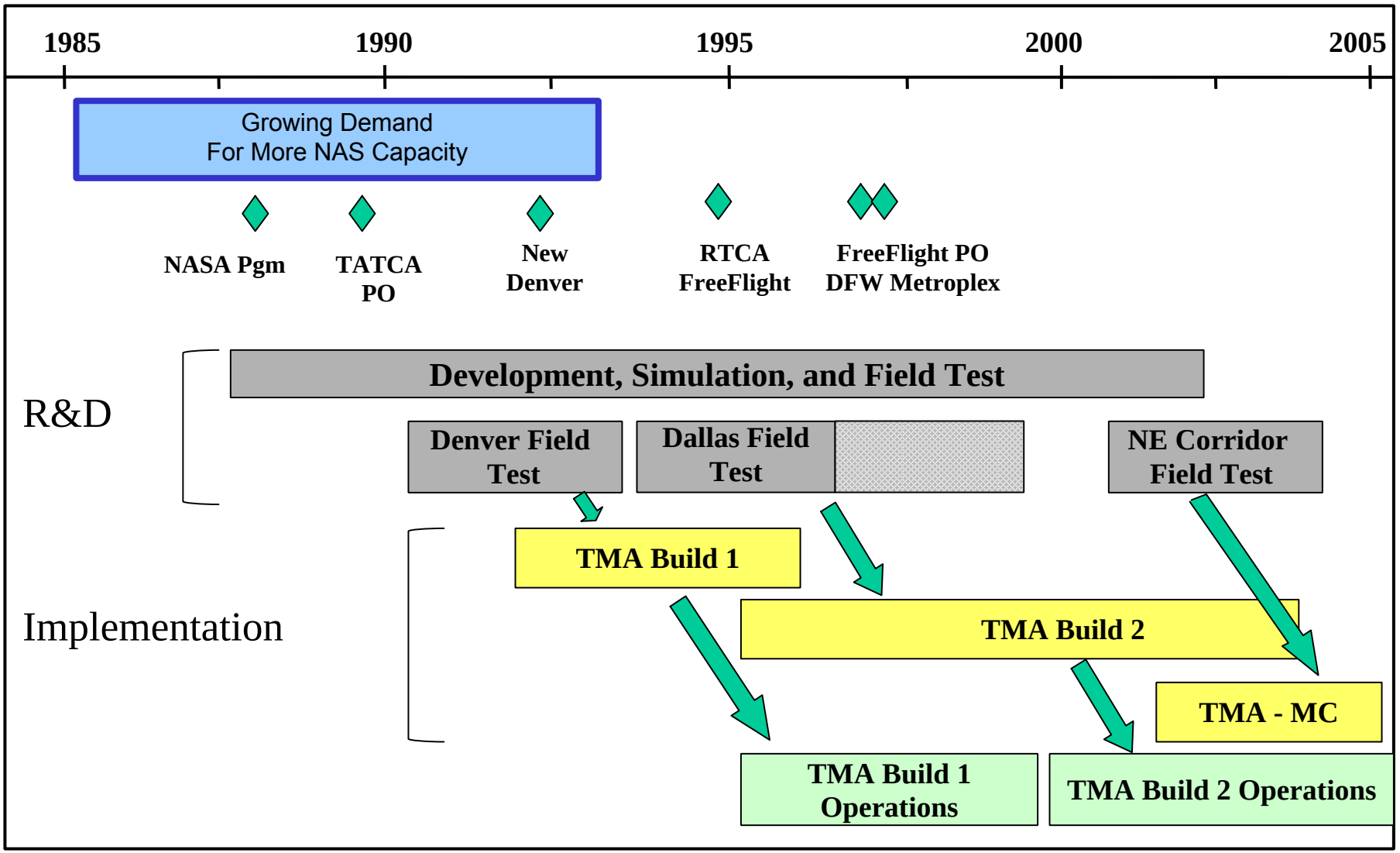




- Assures a smooth flow of arrival traffic into the TRACON
  - Increase airport capacity
  - Reduce arrival delays
  - Reduce controller workload

Courtesy of the Transition Working Group, FAA Research, Engineering and Development Advisory Committee

TMA Program Timeline



Courtesy of the Transition Working Group, FAA Research, Engineering and Development Advisory Committee

Concluding Remarks

- There are many capacity increasing air traffic management and air traffic control concepts and technologies in research.
- Very few capacity increasing concepts or technologies are undergoing the systems engineering required to make them an operational reality.
- Growth of the Air Transportation System is dependent of the continued growth of both the physical infrastructure (runways/airports) and the advances in air traffic management and control concepts and technologies.